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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/537,315	08/22/2005	Poopathy Kathirgamanathan	LUC-012	8381

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EXAMINER

NELSON, MICHAEL E

ART UNIT	PAPER NUMBER
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1794

MAIL DATE	DELIVERY MODE
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11/03/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/537,315	Applicant(s) KATHIRGAMANATHAN ET AL.	
	Examiner MICHAEL E. NELSON	Art Unit 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 August 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 50-54 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 50-54 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>08/11/2008</u> . | 6) <input type="checkbox"/> Other: _____ |

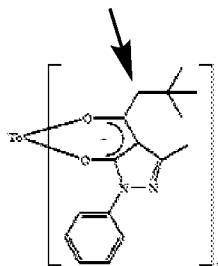
DETAILED ACTION

Status of Claims

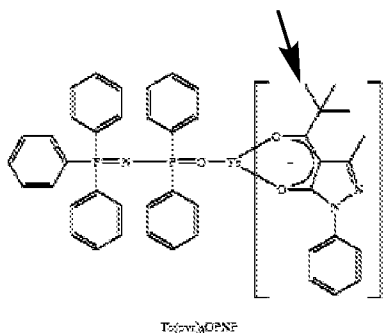
1. In response to Applicant's reply dated 08/11/2008, claims 50-54 are pending. Claims 1-49 have been cancelled. Claims 50-54 are new.

Specification

2. The specification is objected to because the structures and names of the compounds described in Examples 7 and 8 are incorrect.
3. In Example 7, the text states that the $\text{Tb}(\text{}^t\text{BuPz})_3$ of example 4 was heated at reflux, etc. The compound $\text{Tb}(\text{}^t\text{BuPz})_3$ of example 4 has the structure shown below.



4. However, the compound of example 7, has the structure shown below, where a diphenylphosphonimidi tris-phenylphosphoreane ligand has been added to the complex.



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5. The methylene (CH_2) is missing from the structure in the product. From the description and compound name, it appears that the first structure is correct.
6. In example 8, on page 22, line 20, the text states “the $\text{Ca}_2(\text{}^t\text{BuPz})_3$ of example 6.” However, example 6 shows the synthesis of $\text{Ca}(\text{}^t\text{BuPz})_2$. The material is used to form the final product, which is also misnamed on page 23, line 1, as $\text{Ca}_2(\text{}^t\text{BuPz})_3\text{Phen}_2$ when the correct abbreviation should be $\text{Ca}(\text{}^t\text{BuPz})_2\text{Phen}_2$ to match the name and description and the structure. The abbreviations should be corrected in both instances.
7. The structure of $\text{Ca}(\text{}^t\text{BuPz})_2\text{Phen}_2$ on page 23 is also incorrect, since it shows 3 $\text{}^t\text{BuPz}$ ligands when the compound should only have two ligands (to match the starting material and the ionization state of the Calcium metal, and the name). The structure should be redrawn correctly.
8. Correction is required.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 50-51 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kathirgamanathan (WO 9858037) in view of Gao et al. (Synthetic Metals, vol. 99, no. 2, pp 127-132, 1999).

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11. Concerning claims 50-51 and 54, Kathirgamanathan describe organic electroluminescent devices comprising an anodeterbium complex having an first electrode (anode (2) (ITO)), a second electrode (cathode (3)) and a electroluminescent layer (1) between the two electrodes (see Figures 13a to 13d). The device further includes a hole transport layer (4) and an electron injecting layer (5) between the electroluminescent layer and the cathode (figure 13d, page 5, 3rd paragraph). The preferred material for the electron injecting layer is an aluminum quinolate (per claim 54).

12. Kathirgamanathan disclose that the electroluminescent material is a metal complex with a high photoluminescence efficiency, and describes several materials having a diphenylphosphonimide triphenyl phosphorane (OPNP) ligands with high photoluminescent efficiency and electroluminescent properties (abstract, examples). Kathirgamanathan are silent on metal complexes having a 4-t-butylacetyl-3-methyl-1-phenyl-pyrazol-5-one (^tBuPz) ligand.

13. Gao et al. describe organic Terbium complexes comprising pyrazolone ligands with other neutral coligands, such as triphenylphosphineoxide. The materials have high photoluminescent intensity and electroluminescent properties (see for example table 2, and pages 130-131). Gao et al. disclose several alkyl substituent, but not specifically a 4-t-butylacetyl pyrazolone, the nearest being 4-isobutenylpyrazolone (PMIP). However, the change in the alkyl substituent would not be predicted to affect the function of the material as an electroluminescent material.

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14. Given the combined teaching, it would have been obvious to one of ordinary skill in the art to make a terbium complex having a 4-t-butylacetyl-3-methyl-1phenylpyrazolone ligand (analogous to those described by Gao et al.) with an (OPNP) neutral coligand. Given the close similarities in structure, and the fact that all of the materials are described as having electroluminescent properties, one of ordinary skill in the art would reasonable predict that the material would function as an electroluminescent material in an electroluminescent device as described by Kathirgamanathan.

15. Claim 53 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kathirgamanathan (WO 9858037) and Gao et al. (Synthetic Metals, vol. 99, no. 2, pp 127-132, 1999) as applied to claim 50 above, and further in view of Qiu et al. (Thin Solid Films, vol. 372, no. 1-2, pp. 265-270, Sep. 2000).

16. Concerning claim 53, Kathirgamanathan describes the organic electroluminescent device discussed above, including a hole transporting layer. Kathirgamanathan discloses specifically the use of TPD as the hole transporting material. (see page 4, last paragraph-page 5, first paragraph) Kathirgamanathan is silent on the use of NPB as the hole transport material.

17. Qiu et al. describe the photostability and morphological stability of hole transporting materials in organic electroluminescent devices. Qiu et al. compare TPD (used by Kathirgamanathan) with NPB. Qiu et al. discloses that NPB is generally considered a better hole transporting material because it has a higher glass transition

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temperature, and that NPB is also more photostable and has a better morphological stability in the thin film state than TPD. (abstract)

18. Given this teaching, it would have been obvious to one of ordinary skill to use NPB instead of TPD as the hole transporting material in the electroluminescent device discussed above, for the purpose of using a hole transporting material with a higher glass transition temperature, and greater photostability and morphological stability.

Double Patenting

19. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

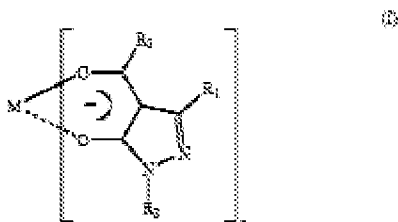
A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

20. Claims 50, 52 and 54 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 5-6, 8-9 of U.S. Patent No. 7211334 in view of Marchetti et al. (Journal of the Chemical Society, Dalton Transactions, pp. 3325-3333, 1998).

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21. U.S. Patent No. 7211334 claims an electroluminescent device having a first electrode, and a second electrode, and a layer of an electroluminescent material between the first and second electrode comprising a material of the formula shown below (claim 1). The device also includes an electron transmitting layer between the second electrode and the electroluminescent layer (claim 5), where the electron transmitting material is aluminum quinolate (claim 9).



M includes specifically calcium (claim 1). The claims are silent on the specific material of the present claims. However, the material of the present claims is a known material, as described by Marchetti et al. (compound 13, scheme 2, page 3332, first paragraph)

22. Given the explicit teaching of calcium pyrazolone complexes as electroluminescent materials, one of ordinary skill would be motivated to use the pyrazolone complex material described by Marchetti et al. in an organic electroluminescent device, and thus arrive at the present claims from the copending claims.

Claims 50, 52 and 54 are directed to an invention not patentably distinct from claims 1, 5-6, 8-9 of commonly assigned U.S. Patent No. 7211334 in view of Marchetti et al. (Journal of the Chemical Society, Dalton Transactions, pp. 3325-3333, 1998). See discussion above.

The U.S. Patent and Trademark Office normally will not institute an interference between applications or a patent and an application of common ownership (see MPEP Chapter 2300). Commonly assigned U.S. Patent No. 7211334, discussed above, would form the basis for a rejection of the noted claims under 35 U.S.C. 103(a) if the commonly assigned case qualifies as prior art under 35 U.S.C. 102(e), (f) or (g) and the conflicting inventions were not commonly owned at the time the invention in this application was made. In order for the examiner to resolve this issue, the assignee can, under 35 U.S.C. 103(c) and 37 CFR 1.78(c), either show that the conflicting inventions were commonly owned at the time the invention in this application was made, or name the prior inventor of the conflicting subject matter.

A showing that the inventions were commonly owned at the time the invention in this application was made will preclude a rejection under 35 U.S.C. 103(a) based upon the commonly assigned case as a reference under 35 U.S.C. 102(f) or (g), or 35 U.S.C. 102(e) for applications pending on or after December 10, 2004.

23. Claims 50, 52 and 54 are rejected under 35 U.S.C. 103(a) as being obvious over U.S. Patent No. 7211334 in view of Marchetti et al. (Journal of the Chemical Society, Dalton Transactions, pp. 3325-3333, 1998).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an

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invention “by another”; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(I)(1) and § 706.02(I)(2).

See discussion above.

Response to Arguments

24. Rejections under 35 U.S.C. 112, second paragraph are withdrawn in light of the cancellation of the rejected claims.

25. Applicant argues that Pillow et al. (WO 02/20692) teaches away from the use of photoluminescent compounds having a co-ligand structure. Pillow et al. teaches that the precise role of the co-ligand is not understood, but their presence is generally thought to be advantageous. However, they do state that their presence can lead to poor reproducibility. Pillow et al. discloses that triphenylphosphine oxide ligands are not strongly bound to the terbium, making them difficult to purify, resulting in a loss of the co-ligand. [0004] Pillow et al. also teach that the co-ligand **may** quench the electroluminescence by accepting the transfer of electrons from the excited state before

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they can be transferred to the terbium ion, and that some ligands (such as phenanthroline) can interfere with the electroluminescent process by forming an excited state from an exciplex. [0005]

26. However, as discussed above, both Kathirgamanathan and Gao et al. disclose the use of co-liganded terbium complexes as electroluminescent materials, including pyrazolone ligand materials. Gao et al. describes the closest prior art, electroluminescent terbium compounds with a pyrazolone anionic ligand with a triphenylphosphine oxide co-ligand. Therefore, one of ordinary skill would be motivated to seek other co-ligands which do not present the problems discussed by Pillow et al. Kathirgamanathan describe the OPNP ligand in organic electroluminescent devices, which shows no evidence of quenching terbium emission, but improved photoemission compared with non co-ligand compounds.

Conclusion

27. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not

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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL E. NELSON whose telephone number is (571)270-3453. The examiner can normally be reached on M-F 7:30am-5:00pm EST (First Friday Off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Callie Shosho can be reached on 571-272-1123. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Michael E. Nelson
Examiner
Art Unit 1794

/Callie E. Shosho/
Supervisory Patent Examiner, Art Unit 1794